Why Indian Scientists Oppose the U.S.-India Nuclear Agreement

by Ramtanu Maitra

At a ceremony in the White House on Dec. 18, U.S. President George W. Bush signed the U.S.-India nuclear agreement, otherwise known as the Henry J. Hyde U.S.-India Peaceful Atomic Energy Cooperation Act. The bill would enable American nuclear transfers to India to take place in the future, following a 32-year moratorium.

In India, however, the opposition to the bill remains strong within the scientific community, which believes that it would stymie India's indigenous and hard-earned thorium fuel-based nuclear program. As a result of their pointed arguments, the Manmohan Singh government has yielded to the parliamentary opposition's demand for a full discussion of the bill in India's Parliament. Although the opposition to the bill stems from two major segments of Indian society—the military and the scientific community—to the chagrin of the government, it is now actively being discussed by political leaders.

On the American side, approval by three other institutions—the 45-nation Nuclear Suppliers Group (NSG), the International Atomic Energy Agency (IAEA), and the U.S. Congress—are still needed before American nuclear transfers to India can take place. Although the U.S. Congress voted overwhelmingly on Dec. 9 to approve the bill, amidst strong resistance put up by the nuclear non-proliferation lobby, Congress still needs to approve the technical details of nuclear trade in a so-called 123 agreement—a peaceful nuclear cooperation pact with a foreign country, under the conditions outlined in Section 123 of the U.S. Atomic Energy Act.

Uneasy Non-Proliferators

There is little doubt that the White House, helped by a massive lobbying team mobilized on Capitol Hill by the Indian Embassy and non-resident Indians, considers passing the bill in a relatively short period of time as a great success in bringing U.S.-Indian relations closer in the near future.

The opposition to the bill within the United States was epitomized by a letter sent to the U.S. Senate in mid-November by 18 arms-control advocates. They said that, without amendments, the proposed legislation "would have far-reaching and adverse effects on U.S. nonproliferation and security objectives." Signers included Robert Einhorn, former Assis-

tant Secretary of State for Nonproliferation; Lawrence Korb, former Assistant Secretary of Defense; Prof. Frank von Hippel of Princeton University; Daryl Kimball of the Arms Control Association; and John Isaacs of the Council for a Livable World.

Their concerns center around India's alleged unwillingness to curb its nuclear weapons program, India's lack of transparency in non-proliferation efforts, and its close ties with Iran. A new report by the Congressional Research Service, which examines policy issues for Congress, found that while India does not want Iran to have nuclear weapons, New Delhi's "views of the Iranian threat and appropriate responses [to that threat] differ significantly from U.S. views." In 2004, Washington imposed sanctions on two Indian scientists for nuclear-related transfers to Iran, and in 2005 and 2006, four Indian companies were sanctioned for chemical-related transfers to Iran, the report noted.

In India, the opposition to the bill is based on an entirely different perspective. India has remained a non-signatory of the Nuclear-Nonproliferation Treaty (NPT) since the Treaty entered into force in 1970, following U.S. ratification. Staying outside of the NPT-regime, India has tested its nuclear devices on three occasions—once in 1974 and twice in 1998. In other words, India has developed nuclear weapons, but it is not recognized as a nuclear weapons state by the five official Nuclear Weapons States (NWS)—United States, Russia, Britain, France, and China—which had all tested their nuclear devices prior to the existence of the NPT.

Atomic Scientists and the Military

The issue of future nuclear tests is important to the opponents of the bill in India, because they consider that such tests are necessary in order to upgrade India's nuclear weapons to match nuclear developments elsewhere, and provide security to the nation. The Hyde Act that President Bush signed, categorically demands that India ban all nuclear explosive tests in the future. It, however, does not address the fact that the United States itself is working on the design of a "Reliable Replacement Weapon" (RRW) to modernize its nuclear arsenal, and may indeed carry out a test in the future!

Moreover, in the "Definitions" section of the contested bill, it is clearly stated that the "Additional Protocol" is to be based on the Model Additional protocol of the IAEA applicable to non-nuclear-weapon states, which is highly intrusive, as pointed out by India's former Atomic Energy Commission (AEC) chairman, M.R. Srinivasan, in a recent article in the English news daily *The Hindu.*

He also pointed out that the Hyde Act makes it clear that the U.S. President has to satisfy himself that India is working actively on an early conclusion of the Fissile Material Control regime (FMCT); that India is supporting the United States in preventing the spread of enrichment and reprocessing technologies; and that India adheres to the Missile Test Control Regime (MTCR) and NSG guidelines (without actually being invited to be a member of these bodies). These actions which India is obliged to take are not consistent with what "a strategic partner" (which Washington wishes India to be) should be taking. Neither are they consistent with what India—described as a "responsible state with advanced technology"—should be mandated to take, Srinivasan affirmed.

What also concerns India's defense planners about the bill, is the way it has been formulated. The Hyde Act calls for achieving a moratorium on the production of fissile material for explosive purposes by India, Pakistan, and the People's Republic of China. It may be recalled that China has been producing fissile material for weapons purposes for a long time, while India was forbidden to do so by the NWS. Therefore, stopping production of fissile material at the same point in time would lead to a serious imbalance. The statement of policy goes on to say that the United States shall "seek to halt the increase of nuclear weapon arsenals in South Asia and to promote their reduction and eventual elimination."

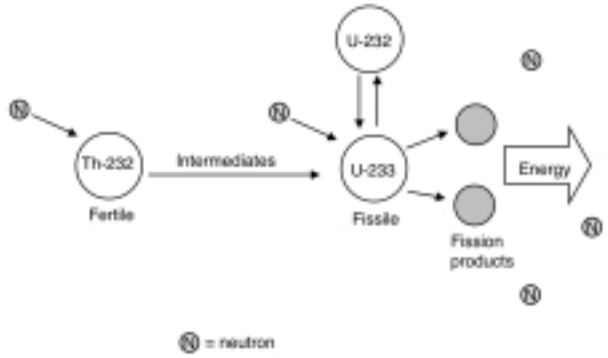
India's Thorium Program Is the Issue

Indian scientists have made their views known about the inadequacy of the Hyde Act, citing two specific areas. First, the bill says categorically that India cannot reprocess spent fuel from its reactors. It demands this because the United States claims that the "no reprocessing" clause would prevent India from getting plutonium, which could be used later for making nuclear weapons. However, there is more to the clause than meets the eye, Indian atomic scientists point out.

India decided on a three-stage nuclear program back in the 1950s, when India's nuclear power generation program was set up. In the first stage, natural uranium (U-238) was used in pressurized heavy water reactors (PHWRs). In the second stage, the plutonium extracted through reprocessing from the used fuel of the PHWRs was scheduled to be used to run fast-breeder reactors (FBRs). The plutonium was used in the FBRs in 70% mixed oxide (MOX)-fuel, to breed uranium-233 in a thorium-232 blanket around the core. In the final stage, the FBRs use thorium-232 and produce uranium-233 for use in the third-stage reactors. (See Ramtanu Maitra, "Thorium: Preferred Nuclear Fuel of the Future," *EIR,* Nov. 18, 2005.)

To a certain extent, India has completed the first stage, despite the fact that it has only built a dozen nuclear power plants so far. The second stage is only realized by a small experimental fast-breeder reactor (13 MW), at Kalpakkam. Meanwhile, the Indian authorities have cleared the Department of Atomic Energy's proposal to set up a 500 MW prototype of the next-generation fast-breeder nuclear power reactor at Kalpakkam, thereby setting the stage for the commercial exploitation of thorium as a fuel source.

Simplified Diagram of the Thorium Fuel Cycle



The neutron trigger to start the thorium cycle can come from the fissioning of conventional nuclear fuels (uranium or plutonium) or an accelerator. When neutrons hit the fertile thorium-232 it decays to the fissile U-233 plus fission fragments (lighter elements) and more neutrons. (Not shown is the short-lived intermediate stage of protactinium-233.)

One reason for India's commitment to switch over to thorium, is its large indigenous supply. With estimated thorium reserves of some 290,000 tons, it ranks second only to Australia. Further, the nation's pursuit of thorium helps to bring independence from overseas uranium sources. Since India is a non-signatory of the NPT, its leaders foresaw that its civil nuclear-energy-generation program would be constrained in the long term by the provisions laid down by the commercial uranium suppliers. The Nuclear Suppliers Group demand that purchasers sign the NPT and thereby allow enough oversight to ensure that the fuel (or the plutonium spawned from it) is not used for making nuclear weapons. A non-signatory of the NPT is prevented from receiving any nuclear-related technology or nuclear fuel.

India has already begun construction of the Advanced Heavy Water Reactor (AHWR) in 2005. The AHWR will use thorium, the "fuel of the future," to generate 300 MW of electricity—up from its original design output of 235 MW. The fuel for the AHWR will be a hybrid core, partly thorium-uranium 233 and partly thorium-plutonium.

In other words, if India cannot reprocess the spent fuel to secure plutonium for the sake of converting thorium into fuel, the thorium reactors will never take off. Separation of plutonium is essential for the eventual use of thorium as a nuclear fuel. India therefore expects that reprocessing will be an important activity of its nuclear energy program. This is what has put the Indian atomic scientists on a warpath against the Singh government's willingness to accept the bill.

Natural uranium contains about 99.3% of the isotope uranium-238 and 0.7% of the fissionable isotope uranium-235. Although uranium-235 is the rarer of the uranium isotopes, it is the one that most readily undergoes nuclear fission, and is thus the most useful for common nuclear applications. Therefore, to use uranium, the proportion of the uranium-235 isotope found in natural uranium must be increased. This process of increasing the fraction of uranium-235 in natural uranium is called enrichment. At the same time, one must note that while uranium-235 is present in natural uranium in small amounts, uranium-233 does not exist in nature. Therefore, thorium-232 must be converted to uranium-233 in order to generate nuclear power.

Not an Easy 123

The second concern of the Indian scientists is the scope of "full civilian nuclear energy cooperation" (Section 123 of the U.S. Atomic Energy Act) that was promised to India in July 2005. India had assumed that this term encompassed the fuel cycle, namely enrichment of uranium and reprocessing of spent fuel. In the discussions leading to the adoption of the Hyde Act, U.S. legislators argued that the U.S. Atomic Energy Act of 1954 specifically forbids export of these technologies, as well as heavy water production technology, to other countries. India has developed its own technologies in these three important areas.

According to an English news daily, *The Times of India,* India's top atomic scientists have spelled out some of the key points which are to be incorporated in the 123 agreement:

- India should not be asked to participate in international non-proliferation efforts with a policy congruent to that of the United States.
- There should be full-scale civilian nuclear cooperation, with an assurance of constant fuel supply.
- India should be free to carry out more nuclear weapons tests.

Although the Bush Administration has shown a great deal of interest in seeing that the nuclear agreement goes through, it is highly unlikely that it would bow to the Indian atomic scientists' demands. At a Dec. 16 powwow in Mumbai, organized by India's present AEC chairman, Anil Kakodkar, and attended by six former atomic czars, *The Times of India* reported a scientist saying: "We hope the voice of the former nuke chiefs will now resound in those areas where the 123 agreement will be negotiated."

This could spell danger for the bill, as well as for the Manmohan Singh government, which has made the bill the centerpiece of its foreign policy initiatives. These top scientists and administrators of the country's nuclear establishment told *The Times of India* that since July 2005, bureaucrats in the External Affairs Ministry were calling the shots, either in New Delhi or at the Indian Embassy in Washington. However, there is now an indication that for the first time, these informed critics of the deal cannot be kept out of the country's nuclear diplomacy.